

ABSTRACT

P-channel MOSFET devices are used as reprogrammable fuse or antifuse elements in a memory decode circuit by utilizing anomalous hole generation. An applied negative gate bias voltage is sufficiently large to cause tunnel electrons to gain enough energy to exceed the band gap energy of the oxide. This causes energetic hole-electron pairs to be generated in the silicon substrate. The holes are then injected from the substrate into the oxide, where they remain trapped. A large shift in the threshold voltage of the p-channel MOSFET results. The device can subsequently be reset by applying a positive gate bias voltage. Various circuits incorporating such fuse or antifuse elements are also disclosed.

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